

Serial No.: 10/803,765
Docket No.: 26223-10

Art Unit: 2813
Examiner: Thanhha Pham

IN THE SPECIFICATION

Thus, the present invention provides a method of electrolessly depositing a metal on at least a part of the surface of a silicon wafer substrate, comprising:

- (a) contacting the silicon wafer substrate with a solution comprising non-precious metal ions so as to obtain a wafer substrate covered with non-precious metal ions; and
- (b) exposing the wafer substrate obtained in step (a) to a reducing solution comprising a reducing agent for reducing the metal ions that cover said substrate to a lower oxidation state. Preferably the reducing agent comprises a borane reducing agent and/or the reducing solution comprises at least one metal ion from Group Ib of the periodic table.

The method of the present invention visualizes dispensing small/minimal amounts of liquid solution onto the wafer substrate. After the desired interaction/reaction at the wafer/puddle interface is completed, the liquid contained in the puddle is spun off by rotating the wafer at a given speed, leaving the wafer surface essentially dry, and devoid of residual liquid on the surface. The wafer substrate is then ready to receive the solution dictated by the next process step.

In addition to minimizing water consumption, above embodiment of the invention potentially reinforces the metalizing reaction by leaving the wafer substrate with a greater concentration of reacting compound, than would be the case if immersion rinsing took place. An indication of such preferred reaction can be found in the co-pending application, by comparing example 1 vs. example 2.

It is noted that electroless copper plating can be embodied via compositions enumerated in co-pending application no. 10/307,510, or using a host of other compositions of the prior art, the majority of which rely on formaldehyde as the main reducing agent. This instant application proposes using preferably, but not limitingly, hypophosphite-based electroless compositions as the principal reducing agent for depositing either electroless copper, electroless nickel, or alloys thereof. The use of hypophosphite as possibly the reducer of choice (as opposed to formaldehyde), is of special importance in embodiments of this instant application calling for heating the wafer substrates, or supplying radiant energy to the wafer substrate, before, during, or

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after its contact with the electroless solution. Indeed, formaldehyde compositions are environmentally objectionable, having been suspected in the literature as potentially carcinogenic.

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